The Problem of Uterine Cancer

By C. G. Lowry, M.D., F.R.C.S.I., F.C.O.G.

Presidential Address, Ulster Medical Society,

SESSION 1932-33

Painstaking analyses of the cancer death-rate have been made over the last few years in England, Scotland, Ireland, and America. These show beyond question that there is a definite increase in the number of deaths from cancer. Three opposing views are held to account for this increase—(a) that the incidence of cancer is becoming greater, (b) that the incidence of the disease is merely the result of more acute diagnostic methods, and (c) that as cancer is more particularly a disease of advancing years, and the probability of life has increased during the last decade, the increase in the cancer death-rate may be the result of the increase in the number of elderly people in the population.

It would be a difficult task, in the light of our present knowledge, to decide which of these views is the correct one. It is, however, clear that the problem of cancer is of vital importance to the community, and in deciding the subject of my presidential address I have been constrained to take for it cancer, with particular reference to its incidence in the uterus. Cancer of this organ forms a very large proportion of all cancer deaths, and in Northern Ireland it forms 13.5 per cent. in females. The untreated case has but a few months to live, and I shall therefore confine my address to the methods of treatment open to the surgeon when confronted with a patient suffering from this disease.

There are two lines of treatment to-day for the woman suffering from cancer of the cervix: operation and radiation.

The modern operation for cancer of the cervix was introduced by Wertheim in Vienna in 1898, but it gained no considerable foothold in this country until Wertheim read his paper on the treatment of cancer of the cervix at the British Medical Association in Leicester, in 1905. The early attempts to eradicate the disease consisted in removal of the cervix, either by caustics, cautery, or the knife. As surgery developed, this was followed by removal of the entire uterus, with nearly one hundred per cent. of fatal recurrences. The Wertheim operation, which is based on an exact anatomical and pathological conception, consists of the removal of the uterus, tubes, ovaries, parametrium, the upper third of the vagina, and the enucleation of the pelvic glands. The difference between the ordinary total hysterectomy and the Wertheim operation is comparable to the difference between a simple excision of the breast and its modern radical removal with pectoral muscles, deep fascia, and thorough clearance of the axillary glands. A simple excision of the breast for cancer would not be considered justifiable surgery to-day, yet I am afraid that many cancerous uteri are still removed by a technique that is absolutely inadequate to afford even a slender chance of the total eradication of the cancer.

Three factors militate against the Wertheim operation :—

First, it is a difficult operation which requires prolonged practice and exact anatomical knowledge, absolutely first-class anæsthesia, and good assistants.

Second, it is attended, even in the most skilful hands, with high primary mortality. Bonney states that the risk of the operation lies less in the operation itself as in the poor average condition of the patients; and I think this is a statement that would be subscribed to by most operating gynæcologists. Apart from the technical difficulties and risks of the operation, these patients as a group form a class of bad risks not met with in any other condition. Carried out by operators skilled in its performance, the primary mortality ranges from eight to eighteen per cent., and the ten-year cures are approximately about one in three of the patients operated on and one in five of those seen.

Third, rarely more than fifty per cent. of the patients presenting themselves are operable by this means. Bonney regarded sixty-three per cent. of his 450 cases as operable. Amongst 1,500 cases recently reported in Vienna, forty-seven per cent. were adjudged operable. Our operability rate is hardly even as good as Vienna; only two out of every five, or forty per cent., presenting themselves at the out-patient department of the Royal Victoria Hospital can be regarded as operable, and many of these are not good risks for operation. Strange as it may seem, more recent years have shown a definite retrogression in the type of case presenting. Whether it is that publicity about the cancer problem has defeated its own ends and created a cancerphobia, or whether patients have the mistaken idea that radium can at any stage of the disease work a miracle, are questions I do not attempt to answer, but the fact remains that the cases presenting for treatment year by year form a very discouraging group.

It is a tragic commentary on early diagnosis—taking the average hospital and private cases—that fully fifty per cent. of sufferers from cancer of the cervix, a cancer accessible to touch and vision, are inoperable when they seek, or are referred to, the gynæcologist.

Radiotherapy scores over operation in two particulars—a very low primary mortality, and secondly, the fifty per cent. who have nothing to hope for from surgery can be helped very materially by radium. Up to ten per cent. cures, even in this latter hitherto hopeless category, are claimed by some operators, and all but four per cent. can be alleviated and their lives prolonged. The low primary mortality with radium is a great factor in its favour—between hospital and private cases I have treated over one hundred cases with only one death, whereas the average mortality rate of all operators with the Wertheim operation is 17.3 per cent., and the more advanced the case the higher the rate. The low primary mortality rate for radium is common to all clinics : I have seen no mortality rate recorded over two per cent.

Acute controversy exists between advocates of operation and those who have become converted to or have always used radium. Up to 1925 I treated all my operable cases by Wertheim's operation, but since then I have only performed the Wertheim operation on early cases and good risks; all the doubtful cases and the

inoperable cases, with two exceptions, have been treated by radiation. Gray Ward of New York, and Arthur Curtis of Chicago, both very accomplished operators, have abandoned the Wertheim operation in favour of radium, for both late and early cases. Victor Bonney is the outstanding advocate of operation, and while his end-results can compare with any of those obtained by radium, he has never been able to get his primary mortality rate below eight per cent. If one can command an adequate amount of radium, it is probably the procedure of choice; at the same time there are cases when the experienced operator can legitimately consider operation—these are early cases who are good risks. Occasionally I have been disappointed with radium. When a case could have been treated by a Wertheim, it is very mortifying a year afterwards, when radium has failed, to reflect that a Wertheim would have been feasible. Furthermore, a highly-strung, nervous patient who is under treatment for three times at intervals of two to three weeks with radium, suffers a good deal of mental strain, and as these patients must be under observation monthly for the first year, every two months for the second year, and every quarter for the third year, they never get a chance of forgetting from what they have been suffering.

In no other department of surgery is a knowledge of medicine more important than in the care of a patient with a cancerous cervix—a thorough physical examination, investigation of the blood picture, the elimination of sepsis, both local and oral, blood transfusion if necessary, are all adjuncts in the treatment.

I have been particularly struck with the high incidence of dental sepsis amongst cancerous out-patients—practically all our patients have to seek the services of the dentist; and many are indebted to Sir Thomas Houston's department for blood transfusions before we attempt to commence treatment by radium. Our results have considerably improved since these precautions have been adopted.

When the end-results from all clinics, operative and radiological, are collected and averaged, the five-year absolute cures only reach twenty to twenty-five per cent. This unfavourable picture is to some extent due to the limit of our skill and knowledge in dealing with cancer, but the outstanding reason is the high percentage of cases which are far advanced before treatment is instituted.

It is an undeniable fact that the percentage of good end-results varies inversely with the extent of the growth. We divide these cancers into four classes according to their extent :—

1. Where the disease is limited to the cervix.
2. Where the disease has extended to the vaginal wall or uterine body.
3. Where the disease has extended to the parametrium or paracervical tissues.
4. Where the disease has produced fixation or has involved adjacent organs, for example, bladder, rectum, ureters, or regional glands.

Now, the relative curability in Class 1 is seventy-five to ninety per cent., Class 2 thirty-five to fifty per cent., Class 3 ten to twenty-five per cent., and Class 4 *nil.*

About twenty per cent. of the total number presenting themselves belong to the first two groups, and these show about sixty per cent. of all the absolute cures,

while about eighty per cent. are in Classes 3 and 4 when they reach the gynæcologist. This accounts for the fact that the total cure rate of cancers of the cervix uteri is under twenty-five per cent., and more nearly twenty per cent., of those seen.

My own experience of operative treatment accords well with that of other surgeons, but my results with radium treatment are frankly disappointing. The main factor responsible for this is the very advanced type of case treated. Prior to my visit to Gray Ward's clinic in New York, every case which was not suitable for a Wertheim I attempted to treat with radium, no matter how hopeless or advanced. In other words, I had not the experience to recognise the limitations of radiation. There was also considerable difficulty in getting the patients to re-attend for their second or third treatments. For example, a patient would have one application, her hæmorrhage ceased, and instead of reporting in three weeks as instructed, in spite of a post card or message, one might not see her for three months or until the hæmorrhage recurred. We obviate this now by giving the treatments at shorter intervals, and in many cases not allowing the patients home until their course is completed. In former times very few inoperable cases were admitted to the wards, and so did not swell the cancer admissions; an occasional case was brought in for examination under anæsthesia if it were of doubtful operability. As radium became available practically every case was brought into the ward, and if there was any chance of benefit, no matter how remote, treatment was given a trial. We still treat many apparently hopeless cases, and benefit a few, but considering how many of the cases are in Classes 3 and 4, a low recovery rate is inevitable.

He would be a bold man who would attempt to speak dogmatically on etiology in any phase of the cancer problem, but there are certain outstanding facts about cancer in general, and cancer of the cervix in particular, which may be stated.

It is generally accepted that cancer does not occur in healthy tissues, and that frequently its onset is preceded by a period of chronic irritation. While a direct hereditary tendency cannot be proved, the work of Maud Slye on mice at the Sprague Memorial Institute in Chicago shows that strains of mice can be produced which show a hundred per cent. vulnerability to new growths following chemical irritation. She has further proved that the tendency to resist cancer is also transmitted. Her work, which involved the experimental investigation of ninety thousand pedigreed mice, is too long to quote, but her experiments, published at various times in detail in the Journal of Cancer Research, will be found well worthy of perusal.

Modern opinion has been inclined to discount the importance of a family history of cancer. The work of Miss Slye and H. Gideon Wells indicates that the pendulum has swung too far in this direction.

Individuals must vary in their susceptibility to the cause or causes of cancer, whatever they may be. W. J. Mayo says: "In no other way can we explain why ninety per cent. of people escape and ten per cent. die of it; it is as logical to accept the hypothesis that ninety per cent. of people have a greater resistance to cancer, as to attempt to force an explanation why only ten per cent. of people come in contact with the hypothetical causative agent."

If we accept the view that unhealthy tissues and chronic irritations are common precursors of cancer, it is obvious that the cervix of the parous woman is frequently both unhealthy and irritated.

Small lacerations of the cervix can occur even in normal labours; much more marked ones may occur in instrumental deliveries, and especially in those cases, still all too common, where forceps have been applied prematurely. A patient left with a laceration almost invariably develops an erosion and ectropion with a mild infection, which in its turn favours the occurrence of a discharge, the discharge provides a chronic irritant which is often enhanced by the use of irritating douches, so that the stage is now set.

If Handley's view is correct, that cancer is a product of lymphstasis, all the conditions are present in a chronically inflamed lacerated cervix to favour it. We know that erosion of the cervix is a frequent pre-cancerous condition. This is an adenomatous overgrowth which Handley maintains is the characteristic product of local lymphatic obstruction. Charlton in the American Journal of Obstetrics and Gynæcology, vol. 21, page 16, makes the following rather rhetorical statement:

"Let every chronically infected cervix be approached not as a cervical catarrh, not as a hypertrophy, not as a laceration, but as unhealthy, irritated tissue which may be the prologue of an epithelial drama whose curtain may ring down on a malignant death." His language has an emotional timbre that does not accord with our Northern simplicity of speech, but his statement undoubtedly embodies a great truth. A great majority of cervical cancers occur in parous women; in fact, cancer of the cervix in a nulliparous woman is a rarity. These nulliparous patients all gave a history of a chronic discharge pointing to an old-standing endocervicitis, which in one case was undoubtedly gonococcal in origin. The great majority of cancers of the cervix occur amongst the very poor. No social class is exempt, but the incidence amongst the poorer classes is certainly high. This observation is common to all clinicians in this country. It is also an undoubted fact that these patients are usually in a low state of health—it may be argued it is the result of the cancer, but I am doubtful if this is the complete explanation. So experienced an observer as Victor Bonney states ("Lancet," 8th February, 1930): "Very few women develop cancer of the cervix until their general condition from other causes has considerably deteriorated." This is in accord with my own experience.

Most authors and textbooks dismiss the etiology with the mention of multiparity leading to cervical injuries and chronic infections—this is certainly true as far as it goes—but I think the influence of inefficient obstetrics on the incidence of cancer of the cervix should be more emphasised. Holland, as is well known, has the lowest maternal mortality rate in Europe. Most of the normal midwifery is done by midwives, who of course do not apply forceps, and the abnormal cases are almost all delivered in hospital by specialists. Now, I think it will be agreed that a low maternal mortality rate goes hand in hand with a low morbidity and traumatism rate. The incidence of cancer generally is higher in Holland than in any country in Europe; in fact, it shares with Denmark and Switzerland the unenviable position of the highest cancer mortality rate in Europe. But when we come to analyse the

organ distribution, we find in spite of this high incidence of the disease, that Holland has a very much lower incidence of cancer of the uterus than England and Wales.

In Japan, where there is a higher birth rate and a higher maternal mortality rate, there is also a markedly raised incidence rate of cancer of the cervix, America, with a higher maternal mortality rate than this country, and, except in a few selected centres, very indifferent obstetric services, has an extremely high incidence of cancer of the cervix—twenty-five per cent. of all cancers in the female in U.S.A. are uterine in situation. So that Holland, with an excellent obstetric service, has a low incidence of cancer of the cervix in spite of a high incidence of the disease generally. Japan, with a poor obstetric service, has a high cervical cancer rate, and so has America; England, with a rather better service than America or Japan, but with a decidedly less efficient one than Holland, comes in the mid-position between these countries as regards incidence of cancer of the cervix.

F. R. Smith, of New York, in a paper published in the "American Journal of Obstetrics and Gynæcology" in January, 1931, reviewed the etiological factors in cancer of the cervix. In an attempt to fix any special factors concerned, Smith carried out a laborious investigation. A series of cases of carcinoma of the cervix was compared with a practically equal number of patients who had escaped the disease, and an attempt was made to discover wherein the two series differed, with the hope of finding possible etiological factors. Only patients who had had two or more pregnancies, and had reached the cancer age, were used for the control group. Knowing cancer of the cervix to be a disease of the poor, the control group was selected from patients in the out-patient clinics and wards of the charitable hospitals. In all, 428 patients were personally interviewed, 226 cancerous and 202 non-cancerous. The two series were compared with reference to the number of labours, the number of *instrumental* deliveries, the occurrence of dry labours, the use of douches, and the presence of untreated cervical lacerations as manifested by leucorrhœa. Smith found that the importance of child-bearing as an etiological factor increased with the number of pregnancies and the number of instrumental labours. Dry labour showed an astounding difference—sixty per cent. for the cancer group and only twenty per cent. for the controls. The presence of cervical lesions as manifested by leucorrhœa was very frequent in the cancer group, and, most striking of all, the large numbers of the cancerous patients who had used lysol douches for a prolonged period—forty-nine per cent. of the cancerous patients compared with eighteen per cent. of the non-cancerous. Lysol is a saponified product of coal tar containing cresol, which in turn comes from beech tar by distillation. Since 1914, when Yamagiwa and Itchikawa succeeded in producing papillomata in rabbits' ears by repeated applications of tar, tars and oils are found in universal employment in the experimental production of cancer. I do not for a moment submit that prolonged lysol douching unassociated with other factors can produce cancer of the cervix, but I do say that an antiseptic which is found to be associated with cancer in forty-nine per cent. of 226 cases should not be prescribed as a routine douche. Prolonged douching by any agent is a useless and often

harmful procedure, but if it is necessary, a choice should be made of some less irritating agent.

As regards the prophylaxis of cancer of the cervix, I would put good midwifery first, which, while it cannot totally eliminate damage to the cervix, will certainly minimise its frequency and severity; second, avoidance of infection; and finally, rational treatment of erosions, and of the infected and lacerated cervix. A frequent symptom which brings these patients to the doctor is leucorrhœal discharge. Too often they are simply told to douche, and not infrequently, with lysol. Lysol has marked irritating properties to some vaginal mucous membranes, and may actually increase the discharge. Too often the patient goes on increasing the strength of the douche, until she is using the solution in dilutions far beyond what was recommended, and may even do so for years. I pride myself that on passing a speculum I can tell a patient who is using lysol as infallibly as if the label were stuck on her cervix. My students, past and present, will confirm the statement that I have condemned its use for years, and Smith's observation only confirms me in my opinion.

The length of time the tissues are irritated before becoming cancerous is usually a matter of years, although we occasionally see a cancer of the cervix after a single birth which has only occurred two or three years previously. In the life of a mouse the irritant must usually be applied for about one-sixth of the normal span of life, an interval which corresponds to ten or fifteen years in the life of man. This point is of interest when taken together with the clinical fact that a man usually has to work from seven to fifteen years around certain dyes or oils or tar before he succumbs to cancer. As Wells says the suggestion to be derived from these observations is that when a cancer is found in a patient about forty-five years of age, it is probable the process of irritation or whatever it was that gave rise to the lesion, came into existence from ten to fifteen years before.

To a more general aspect of the subject I should like to refer before closing this section, that is, the possibility of there being an infectious element. I have been struck on several occasions in analysing the history of a patient by the fact that some time previously, often ten or fifteen years, she had been in close contact for a fairly prolonged period with a patient suffering from cancer who had a profuse discharge. I shall only give you one instance, although I have six equally striking. I saw a single girl of 24 at the Ulster Hospital in the year 1919 with an inoperable cancer of the cervix. Analysis of her history revealed that as a girl of 15, nine years previously, she had been in constant attendance on her mother, who died of cancer of the œsophagus, and who for the last few weeks of her life regurgitated a great deal of her food. This girl slept in the same bed as her mother, and was her sole attendant. She had always suffered from leucorrhœa. The possibility of systemic infection fastening on a *locus minoris resistentiæ* cannot fail to occur to one. This case set me to investigate others, and while one must be careful in inquiring about cancerous antecedents, I have convinced myself that the patient with an offensive discharge may possibly be a source of danger. There can be no dispute that these discharges are oftentimes treated in all too casual a manner. I have seen some

gross examples, and will give you two of them. I was asked by a medical man to see a woman on whom I had operated in the Royal Victoria Hospital four years previously, and who was dying of a recurrence. She was living in a small house, and was one of eleven occupants. There was no bathroom in the house. A married daughter who had a family was looking after her and doing the cooking. Considering the amount of the discharge, and the limited sanitary accommodation in the house, one cannot escape the feeling that had the patient been suffering from typhoid instead of malignant disease, it would not have been long until there had been a severe outbreak of enteric. Again I was called to see, in a small street, one of two single women who kept a small shop and lived above it. The patient was dying from a cancer of the body of the uterus, and had a most profuse, offensive discharge. I put on a pair of gloves, but before I could interfere her sister dashed forward and removed a soaked diaper. At this moment a bell in the shop rang, and, giving her fingers a perfunctory wipe on her apron, she ran downstairs to attend to the customer! Again the thought arises: had that patient had typhoid and not cancer, how long would it have been before that street would have been stricken with a typhoid epidemic? No one would handle a syphilitic, tuberculous, or leperous discharge without taking the greatest possible pains to preserve oneself from infection, and I feel sure that the cancerous discharge should be treated with equal respect. Amongst the poorer classes whose homes do not lend themselves to proper hygienic and sanitary precautions, I think it would be a step forward if inoperable discharging cancers could be removed and segregated in properly-equipped institutions.

Too frequently the first observed symptoms in cancer of the uterus represent not the onset, but often a comparatively advanced stage. Until ulceration, abrasion, or slight trauma causes hæmorrhage, or until the necrotic changes, which sooner or later set in, manifest themselves by a discharge, the growth may go on silently and insidiously. It is imperative, therefore, that the slightest deviation from the normal either in the line of hæmorrhage or discharge, especially in the multiparous woman of 35 or over, should be carefully investigated. Even in the fourth decade of the twentieth century, too many women with the seemingly trivial symptoms of a sanguineous discharge or a thin leucorrhœa, are treated on medicinal lines or with douches, instead of in the first instance being subjected to a thorough pelvic examination. It cannot be too emphatically said that there is no medicinal or glandular treatment for metrorrhagia. The manufacturers, distributors, and advertisers of the various glandular preparations assume a heavy responsibility by the extravagant claims they make for their preparations, and the practitioner whose critical faculty is not acute may easily be misled by their so-called literature. Every case demands rigorous examination to ascertain the cause, and, if there is any doubt, examination under anæsthesia, curettage, or excision of a portion of tissue for examination are urgently called for. Graves truly says: "The life of a patient with cancer of the cervix depends on early detection of the disease." It follows it is never safe to neglect even apparently trifling symptoms, as by the time *any* symptoms are apparent the disease on examination may prove to be well established. Since cancer of the cervix is accesible to touch and vision, a mistaken diagnosis is

unlikely if an examination is undertaken. The tragedy occurs when examination as a routine procedure is omitted. It is well to approach every case of irregular hæmorrhage, especially if the patient has reached middle life, with this query in one's mind—*can this be a cancer of the uterus?* In women past the menopause the merest staining or spotting, in the great majority of cases, is due to cancer. A polypus or senile vaginitis or endometritis may account for a few, but in my experience, hæmorrhage in a patient after the climacteric must be viewed with the gravest suspicion : it should be regarded as cancerous in origin until indubitably proved otherwise. Usually the earliest symptom is hæmorrhage, slight in amount and irregular in occurrence. When occurring after intercourse or exertion it is especially significant. Hæmorrhage may follow intercourse in cases of bad erosion or mucous polypus, but its occurrence always demands examination. In early cancer, menstruation is not necessarily altered either in amount or frequency. The next symptom to appear is a discharge, and sometimes its appearance precedes the bleeding. It is usually thinner than the ordinary leucorrhœa, not infrequently it is slightly brownish in colour, and in the early stages has no offensive odour. Pain is *never* an early symptom of the disease. When it is present it probably means that the cellular tissue around the cervix is already to some extent involved. Cancerous infiltration probably causes pain at first by blocking the lymphatic circulation of the affected areas. The pain is felt chiefly in the lower part of the back, and is subject to exacerbations; it is not relieved by lying down, and is often worse at night than during the day.

Loss of weight, cachexia, pain, enlargement of inguinal glands, and offensive leucorrhœal discharge are valueless in the diagnosis of cancer of the uterus—death has set its seal on those in whom these symptoms are apparent.

Digital examination reveals friable tissue which bleeds freely on palpation—there is no more easily elicited sign in all clinical gynæcology and nothing more valuable than this *"bleeding on examination."* Patients may sometimes be unwilling to submit to examination, but the medical man's duty is to explain the necessity for it, and he should decline absolutely to be responsible for a case where examination is refused. To prescribe a drug like Ergot, a glandular preparation, or a douche, to a patient with irregular hæmorrhage, even though slight in amount, is a grave dereliction of duty, and especially in the middle-aged or elderly patient.

The cervix should next be examined with the speculum in a good light. In well-established cases the merest novice cannot fail to detect the disease—the friability of the tissues and the free bleeding, excited even by swabbing with cotton-wool, are distinctive. But an occasional case comes under observation before surface ulceration has occurred, and in this type diagnosis may present considerable difficulty. These non-ulcerated patches bear a certain resemblance to a cervical erosion. To the touch an erosion feels smooth and velvety, while a cancer is slightly roughened or distinctly nodular, the tissues of the erosion are firm, and not friable, and although an erosion sometimes bleeds from one or two points after swabbing with cotton-wool, the amount is slight; in the case of cancer the bleeding is free and generally distributed over the suspicious area.

On the whole, examination with finger is more valuable than with the speculum, but the speculum is useful in detecting a bleeding polypus, which in an irregular cervix may quite easily escape detection on digital examination. In doubtful cases there should be no hesitation in excising a portion for microscopic examination—it is not often necessary, but is occasionally of great value. "In a statistical study of matter obtained in Graves's clinic, Pemberton and Smith found that recourse to the microscope was necessary for the establishment of a diagnosis in only 2.39 per cent. of their cases of cancer of the cervix"—(Curtis).

A special word of warning is necessary as regards cancer of the endocervix. Here the portio vaginalis may appear quite smooth, but is usually increased in size. *Bimanual* examination will provoke a discharge and blood from the cervical canal; and in the case of a multipara there is usually no difficulty in passing a small loop of a curette into the cervical canal and withdrawing a fragment for examination. These cases can be missed, however, and it is of great importance that they should not, because the parametrium and regional lymph-glands are attacked earlier in this type of the disease than in cancer affecting the vaginal portion of the cervix.

REVIEW

THE PHYSICAL MECHANISM OF THE HUMAN MIND. By A. G. Douglas, M.B., B.Ch. 1932. Edinburgh: E. & S. Livingstone. pp. 251 + ix; figures 24. Price 15s. net.

It has been said that psychology has been made an unnecessarily difficult subject by so much introduction of what might be called "psychological jargon," and in the opening chapter of this book the author goes a step further and says: "There is remarkable unanimity of opinion that physchology has so far failed to attain the status of a science." Whether one agrees or disagrees with either of these two statements, opinion must be unanimous that a thorough understanding of the physiological reactions of the central nervous system is essential before one begins to build theories either physiological or psychological. With such an object in view, no better book could be chosen for study than this well-arranged volume by Dr. Douglas. It begins with an introductory chapter on mind and matter, then passes to a detailed description of the various forms of nerve-cells, and to a lucid account of the principles of nerve-action. Psychoneural correlation is then discussed, the author taking the mind of a child for investigation to illustrate the points raised. A clear account is then given of primitive reactions, conditioned reflexes, space-time perception, habit, instinct, emotion, etc., and concludes with a chapter on the limitation of mind. The book as a whole is well written; it is illustrated by numerous well-chosen diagrams, and may be recommended to any medical man interested in this important subject.